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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/622,923	07/17/2003	Gregg Baeckler	015114-066500US	2777
26059 7590 05/30/2007 TOWNSEND AND TOWNSEND AND CREW LLP/ 015114 TWO EMBARCADERO CENTER 8TH FLOOR SAN FRANCISCO, CA 94111-3834			EXAMINER PARIHAR, SUCHIN	
			ART UNIT 2825	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/622,923	<b>Applicant(s)</b> BAECKLER ET AL.	
	<b>Examiner</b> Suchin Parihar	<b>Art Unit</b> 2825	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 4/23/2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4-6,9-12,14,17-19 and 21 is/are rejected.
- 7) ☒ Claim(s) 2-3, 7-8, 13, 15-16, 20 and 22 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. This office action is in response to application 10/622,923, after-final remarks filed 4/23/2007. Claims 1-22 are pending in this application. No claims are currently amended.

2. Applicant's arguments filed 4/23/2007 have been fully considered and are persuasive. The finality of the previous office action dated 2/21/2007 has been withdrawn.

#### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. **Claims 3-6 and 17-19 rejected under 35 U.S.C. 112, second paragraph**, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. With respect to claim 3, the first limitation recites "if the LUTs do not implement the same function, .... Provide a second rearranged order [of the input signals]", while the second limitation recites "determining if both LUTs implement the same function based on the second rearranged order of the input signals". The two limitations conflict with each other. More specifically, a second rearranged order of input signals is only provided in the first step if it is already determined that the LUTs **do not** implement the same function, as recited in the first step. Then, the second step goes on to determine whether the LUTs implement the same function based on the second rearranged order of input signals, wherein it has already been determined by the first step that the LUTs

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do not implement the same function by the presence of the second rearranged order.

Examiner suggests clarifying this language to point out the intended meaning.

6. With respect to claims 4 and 17, these claims follow similarly to claim 3; see paragraph above pertaining to claim 3.

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. **Claims 1, 10 and 14 are rejected under 35 U.S.C. 102(e)** as being anticipated by Pedersen (US 6,798,240).

9. With respect to claims 1, 10 and 14, Pedersen teaches:

selecting first and second LUTs from the design (first and second LUT circuits, Col 2, lines 5-10);

determining whether both of the LUTs implement a same function (first LUT circuit and second LUT circuit are identical [i.e. same function], Col 2, lines 5-10); and

if the first and second LUTs implement the same function (identical boolean functions, see claim 34 of Pedersen), combining masks (making one mask that accomplishes a first and second respective identical boolean functions, see claim 34 of

reference) of the LUTs into a shared LUT mask (combined LUT mask implementing a first and a second LUT circuits, see claim 34 of Pedersen) in the design.

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. **Claims 4, 9, 11 and 17 are rejected under 35 U.S.C. 103(a)** as being unpatentable over Pedersen (US 6,798,240) in view of Andreev et al. (US 6,848,094).

12. With respect to claims 4, 11 and 17, Pedersen teaches all the elements of claims 1 and 14, from which the claims depend respectively. Pedersen fails to teach:

rearranging an order of at least two input signals of the first LUT with respect to input terminals of the first LUT to provide a first rearranged order; and

determining if both LUTs implement the same function based on the first rearranged order of the first input signals.

However, Andreev teaches: rearranging an order of at least two input signals (re-ordering the inputs of the logic elements, Col 1, lines 20-30) and determining if both LUTs/functions implement the same function based on the rearranged order (identifying and removing redundant circuits [i.e. circuits that implement the same function], Col 1, lines 5-12).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Andreev into the invention of Pedersen for at least the following

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reason(s): Andreev improves Pedersen by using rearranged/re-ordered input signals to determine whether two LUTs/circuits implement the same function. Pedersen also helps solve a similar problem to Andreev in that Pedersen helps to minimize resources (see Pedersen, Col 2, lines 10-15), wherein Andreev is removing redundancy from an IC design (see Andreev, Col 1, lines 5-12). Examiner notes that removing redundant circuits and minimizing resources are considered analogous descriptions of the same problem in the art.

13. With respect to claim 9, Pedersen teaches all the elements of claim 1, from which the claim depends. Pedersen fails to teach all the elements of claim 9. However, Andreev teaches: determining if an output value of the first LUT (compare output value c with that of another function output, see Figure 6A) equals an output value of the second LUT (one of the functions from the set {}, see Figure 6A) for each possible input value that is applied to the input terminals of both of the LUTs.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Andreev into the invention of Pedersen for at least the following reason(s): Andreev improves Pedersen by using rearranged/re-ordered input signals to determine whether two LUTs/circuits implement the same function. Pedersen also helps solve a similar problem to Andreev in that Pedersen helps to minimize resources (see Pedersen, Col 2, lines 10-15), wherein Andreev is removing redundancy from an IC design (see Andreev, Col 1, lines 5-12). Examiner notes that removing redundant circuits and minimizing resources are considered analogous descriptions of the same problem in the art.

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14. **Claims 12 and 21 are rejected under 35 U.S.C. 103(a)** as being unpatentable over Pedersen (US 6,798,240) in view of Wallace (US 2006/0117280).

15. With respect to claims 12 and 21, Pedersen teaches all the elements of claims 1 and 14, from which the claim depends. Pedersen fails to teach all the elements of claims 12 or 21. However, Wallace teaches:

breaking apart the mask of the LUTs (i.e. disjoint-support decomposition into simpler functions, paragraph [0047]) if the mask lies in a critical path in the design (minimize logic levels from the critical path, paragraph [0039]) and placing the first and second LUTs into different logic elements (i.e. multi-gate, paragraph [0039]) within the design.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Wallace into the invention of Pedersen for at least the following reason(s): Wallace improves Pedersen by providing a method of identifying logic input equivalences (see Wallace, paragraph [0003]) and determining whether certain circuits implement the same function (see Wallace, paragraph [0006]), a same problem Pederson solves.

***Allowable Subject Matter***

16. Claims 2-3 and 15-16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

17. With respect to claims 2 and 15, the prior art of record fails to teach:

before determining whether the LUTs implement the same function, identifying common input signals between the first and second LUTs; and

rearranging an order of input signals of one of the LUTs so that each of the common input signals is applied to a corresponding input terminal in both of the LUTs to provide a first rearranged order of the input signals,

wherein the method determines whether the LUTs implement the same function based on the first rearranged order of the input signals.

18. Claims 5-6 and 18-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims as well as rewritten to overcome the USC 112, 2<sup>nd</sup> paragraph rejection as presented in this office action.

19. With respect to claims 5 and 18, the prior art made of record fails to teach:

if the LUTs implement the same function with the first rearranged order, combining the masks of the LUTs into a shared LUT mask in the design; and

if the LUTs do not implement the same function with the first rearranged order, rearranging the order of at least two input signals of the first LUT with respect to the input terminals of the first LUT to provide a second rearranged order.

20. Claims 7-8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

21. With respect to claim 7, the prior art made of record fails to teach:



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before determining if the LUTs implement the same function, determining if the LUTs have at least N common input signals; and

if the LUTs do not have at least N common input signals, preventing the masks of the LUTs from being combined.

22. Claims 13, 20 and 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

23. With respect to claims 13, 20 and 22, the prior art made of record fails to teach:  
determining if the LUTs have at least N common input signals; and  
determining whether the LUTs have no more than M unique input signals,

### ***Response to Arguments***

24. Applicant's arguments filed 4/23/2007 have been fully considered and are persuasive. The finality of the previous office action dated 2/21/2007 has been withdrawn.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Suchin Parihar whose telephone number is 571-272-6210. The examiner can normally be reached on Mon-Fri, 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Chiang can be reached on 571-272-7483. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

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